

2010-09-21seqlist23388

SEQUENCE LISTING

<110> Statens Serum Institut

<120> Tuberculosis vaccine and diagnostics
based on the Mycobacterium tuberculosis esat-6 gene family

<130> 23388us1

<160> 59

<170> FastSEQ for Windows Version 3.0

<210> 1

<211> 100

<212> PRT

<213> M.Tuberculosis

<400> 1

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Met Ala Glu Met Lys Thr Asp Ala Ala Thr Leu Ala Gln Glu Ala Gly
 1      5      10      15
Asn Phe Glu Arg Ile Ser Gly Asp Leu Lys Thr Gln Ile Asp Gln Val
 20      25      30
Glu Ser Thr Ala Gly Ser Leu Gln Gly Gln Trp Arg Gly Ala Ala Gly
 35      40      45
Thr Ala Ala Gln Ala Ala Val Val Arg Phe Gln Glu Ala Ala Asn Lys
 50      55      60
Gln Lys Gln Glu Leu Asp Glu Ile Ser Thr Asn Ile Arg Gln Ala Gly
 65      70      75      80
Val Gln Tyr Ser Arg Ala Asp Glu Glu Gln Gln Ala Leu Ser Ser
 85      90      95
Gln Met Gly Phe
      100

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<210> 2

<211> 95

<212> PRT

<213> M.Tuberculosis

<400> 2

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Met Thr Glu Gln Gln Trp Asn Phe Ala Gly Ile Glu Ala Ala Ala Ser
 1      5      10      15
Ala Ile Gln Gly Asn Val Thr Ser Ile His Ser Leu Leu Asp Glu Gly
 20      25      30
Lys Gln Ser Leu Thr Lys Leu Ala Ala Ala Trp Gly Gly Ser Gly Ser
 35      40      45
Glu Ala Tyr Gln Gly Val Gln Gln Lys Trp Asp Ala Thr Ala Thr Glu
 50      55      60
Leu Asn Asn Ala Leu Gln Asn Leu Ala Arg Thr Ile Ser Glu Ala Gly
 65      70      75      80
Gln Ala Met Ala Ser Thr Glu Gly Asn Val Thr Gly Met Phe Ala
 85      90      95

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<210> 3

<211> 96

<212> PRT

<213> M.Tuberculosis

<400> 3

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Met Ser Gln Ile Met Tyr Asn Tyr Pro Ala Met Leu Gly His Ala Gly
 1      5      10      15
Asp Met Ala Gly Tyr Ala Gly Thr Leu Gln Ser Leu Gly Ala Glu Ile
      Page 1

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      20      25      30
Ala Val Glu Gln Ala Ala Leu Gln Ser Ala Trp Gln Gly Asp Thr Gly
      35
Ile Thr Tyr Gln Ala Trp Gln Ala Gln Trp Asn Gln Ala Met Glu Asp
      50
Leu Val Arg Ala Tyr His Ala Met Ser Ser Thr His Glu Ala Asn Thr
      65
Met Ala Met Met Ala Arg Asp Thr Ala Glu Ala Ala Lys Trp Gly Gly
      85      90      95

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<210> 4
<211> 294
<212> DNA
<213> M Tuberculosis

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<220>
<221> CDS
<222> (1)...(294)

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<400> 4
atg agc ctt ttg gat gct cat atc cca cag ttg gtg gcc tcc cag tcg      48
Met Ser Leu Leu Asp 5 Ala His Ile Pro Gln Leu Val Ala Ser Gln Ser
1
gcg ttt gcc gcc aag gcg ggg ctg atg cgg cac acg atc ggt cag gcc      96
Ala Phe Ala Ala Lys Ala Gly Leu Met 25 Arg His Thr Ile Gly Gln Ala
20
gag cag gcg gcg atg tcg gct cag gcg ttt cac cag ggg gag tcg tcg      144
Glu Gln Ala Ala Met Ser Ala Gln Ala Phe His Gln Gly Glu Ser Ser
35
gcg gcg ttt cag gcc gcc cat gcg cgg ttt gtg gcg gcc gcc aaa      192
Ala Ala Phe Gln Ala Ala His 55 Ala Arg Phe Val Ala Ala Ala Lys
50
gtc aac acc ttg ttg gat gtc gcg cag gcg aat ctg ggt gag gcc gcc      240
Val Asn Thr Leu Leu Asp 70 Ala Gln Ala Asn 75 Leu Gly Glu Ala Ala
65
ggt acc tat gtg gcc gcc gat gct gcg gcc gcg tcg acc tat acc ggg      288
Gly Thr Tyr Val Ala 85 Ala Asp Ala Ala 90 Ala Ser Thr Tyr Thr
95
ttc tga      294
Phe *

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<210> 5
<211> 97
<212> PRT
<213> M Tuberculosis

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<400> 5
Met Ser Leu Leu Asp Ala His Ile Pro Gln Leu Val Ala Ser Gln Ser
1
Ala Phe Ala Ala Lys Ala Gly Leu Met 10 Arg His Thr Ile Gly Gln Ala
20
Glu Gln Ala Ala Met Ser Ala Gln Ala Phe His Gln Gly Glu Ser Ser
35
Ala Ala Phe Gln Ala Ala His 55 Ala Arg Phe Val Ala Ala Ala Lys
50
60

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Val Asn Thr Leu Leu Asp Val Ala Gln Ala Asn Leu Gly Glu Ala Ala
 65 Gly Thr Tyr Val Ala 70 Ala Asp Ala Ala 75 Ala Ser Thr Tyr Thr 80
 85 90 95 Gly
 Phe

<210> 6
 <211> 339
 <212> DNA
 <213> M Tuberculosis

<220>
 <221> CDS
 <222> (1)...(339)

<400> 6
 ttg atc ccc ggt cgg atg gtg ctg aac tgg gaa gat ggc ctc aat gcc 48
 Leu Ile Pro Gly Arg Met Val Leu Asn Trp Glu Asp Gly Leu Asn Ala
 1 5 10 15

ctt gtt gcg gaa ggg att gag gcc atc gtg ttt cgt act tta ggc gat 96
 Leu Val Ala Glu Gly Ile Glu Ala Ile Val Phe Arg Thr Leu Gly Asp
 20 25 30

cag tgc tgg ttg tgg gag tcg ctg ctg ccc gac gag gtg cgc cga ctg 144
 Gln Cys Trp Leu Trp Glu Ser Leu Leu Pro Asp Glu Val Arg Arg Leu
 35 40 45

ccc gag gaa ctg gcc cgg gtg gac gca ttg ttg gac gat ccg gcg ttc 192
 Pro Glu Glu Leu Ala Arg Val Asp Ala Leu Leu Asp Pro Ala Phe
 50 55 60

ttc gcc ccg ttc gtg ccg ttc ttc gac ccg cgc agg ggc cgg ccg tcg 240
 Phe Ala Pro Phe Val Pro Phe Phe Asp Pro Arg Arg Gly Arg Pro Ser
 65 70 75 80

acg ccg atg gag gtc tat ctg cag ttg atg ttt gtg aag ttc cgc tac 288
 Thr Pro Met Glu Val Tyr Leu Gln Leu Met Phe Val Lys Phe Arg Tyr
 85 90 95

cgg ctg ggc tat gag tcg ctg tgc cgg gag gtg gct gat tcg atc acc 336
 Arg Leu Gly Tyr Glu Ser Leu Cys Arg Glu Val Ala Asp Ser Ile Thr
 100 105 110

tga 339

<210> 7
 <211> 112
 <212> PRT
 <213> M Tuberculosis

<400> 7
 Met Ile Pro Gly Arg Met Val Leu Asn Trp Glu Asp Gly Leu Asn Ala
 1 5 10 15
 Leu Val Ala Glu Gly Ile Glu Ala Ile Val Phe Arg Thr Leu Gly Asp
 20 25 30
 Gln Cys Trp Leu Trp Glu Ser Leu Leu Pro Asp Glu Val Arg Arg Leu
 35 40 45
 Pro Glu Glu Leu Ala Arg Val Asp Ala Leu Leu Asp Pro Ala Phe
 50 55 60
 Phe Ala Pro Phe Val Pro Phe Phe Asp Pro Arg Gly Arg Pro Ser
 65 70 75 80

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Thr Pro Met Glu Val Tyr Leu Gln Leu Met Phe Val Lys Phe Arg Tyr
 85 90
 Arg Leu Gly Tyr Glu Ser Leu Cys Arg Glu Val Ala Asp Ser Ile Thr
 100 105 110

<210> 8
 <211> 285
 <212> DNA
 <213> M Tuberculosis

<220>
 <221> CDS
 <222> (1)...(285)

<400> 8
 atg acc atc aac tat caa ttc ggg gac gtc gac gct cac ggc gcc atg 48
 Met Thr Ile Asn Tyr 5 Gln Phe Gly Asp Val 10 Asp Ala His Gly Ala Met 15
 atc cgc gct cag gcc ggg tcg ctg gag gcc gag cat cag gcc atc att 96
 Ile Arg Ala Gln Ala Gly Ser Leu Glu Ala Glu His Gln Ala Ile Ile 20 25 30
 tct gat gtg ttg acc gcg agt gac ttt tgg ggc ggc gcc ggt tcg gcg 144
 Ser Asp Val 35 Leu Thr Ala Ser Asp Phe Trp Gly Gly Ala 45
 gcc tgc cag ggg ttc att acc cag ctg ggc cgt aac ttc cag gtg atc 192
 Ala Cys Gln Gly Phe Ile Thr 55 Gln Leu Gly Arg Asn 60 Phe Gln Val Ile 50
 tac gag cag gcc aac gcc cac ggg cag aag gtg cag gct gcc gcc aac 240
 Tyr Glu Gln Ala Asn 70 His Gly Gln Lys Val 75 Gln Ala Ala Gly Asn 80 65
 aac atg gca caa acc gac agc gcc gtc ggc tcc agc tgg gcc taa 285
 Asn Met Ala Gln Thr 85 Asp Ser Ala Val Gly 90 Ser Ser Trp Ala *

<210> 9
 <211> 94
 <212> PRT
 <213> M Tuberculosis

<400> 9
 Met Thr Ile Asn Tyr Gln Phe Gly Asp Val Asp Ala His Gly Ala Met
 1 5 10 15
 Ile Arg Ala Gln Ala Gly Leu Leu Glu Ala Glu His Gln Ala Ile Val
 20 25 30
 Arg Asp Val Leu Ala Ala Gly Asp Phe Trp Gly Gly Ala Gly Ser Val
 35 40 45
 Ala Cys Gln Glu Phe Ile Thr Gln Leu Gly Arg Asn Phe Gln Val Ile
 50 55 60
 Tyr Glu Gln Ala Asn 70 His Gly Gln Lys Val 75 Gln Ala Ala Gly Asn 80 65
 Asn Met Ala Gln Thr 85 Asp Ser Ala Val Gly 90 Ser Ser Trp Ala

<210> 10
 <211> 285
 <212> DNA
 <213> M Tuberculosis

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<220>
 <221> CDS
 <222> (1)...(282)

<400> 10
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 1
 atc cgc gct cag gcc ggg ttg ctg gag gcg gag cat cag gcc atc gtt 96
 Ile Arg Ala Gln Ala Gly Leu Leu Glu 25 Ala Glu His Gln 30 Ile Val 20
 cgt gat gtg ttg gcc gcg ggt gac ttt tgg ggc ggc gcc ggt tcg gtg 144
 Arg Asp Val 35 Leu Ala Ala Gly Asp 40 Phe Trp Gly Gly 45 Ala Gly Ser Val
 gct tgc cag gag ttc att acc cag ttg ggc cgt aac ttc cag gtg atc 192
 Ala Cys Gln Glu Phe Ile Thr 55 Gln Leu Gly Arg Asn 60 Phe Gln Val Ile 50
 tac gag cag gcc aac gcc cac ggg cag aag gtg cag gct gcc ggc aac 240
 Tyr Glu Gln Ala Asn Ala His Gly Gln Lys Val 75 Gln Ala Ala Gly Asn 80 65
 aac atg gca caa acc gac agc gcc gtc ggc tcc agc tgg gcc 282
 Asn Met Ala Gln Thr 85 Asp Ser Ala Val Gly 90 Ser Ser Trp Ala
 tga 285

<210> 11
 <211> 94
 <212> PRT
 <213> M Tuberculosis

<400> 11
 Met Thr Ile Asn Tyr Gln Phe Gly Asp Val Asp Ala His Gly Ala Met
 1 5 10 15
 Ile Arg Ala Gln Ala Gly Leu Leu Glu Ala Glu His Gln Ala Ile Val
 20 25 30
 Arg Asp Val Leu Ala Ala Gly Asp Phe Trp Gly Gly Ala Gly Ser Val
 35 40 45
 Ala Cys Gln Glu Phe Ile Thr Gln Leu Gly Arg Asn Phe Gln Val Ile
 50 55 60
 Tyr Glu Gln Ala Asn Ala His Gly Gln Lys Val Gln Ala Ala Gly Asn
 65 70 75 80
 Asn Met Ala Gln Thr Asp Ser Ala Val Gly Ser Ser Trp Ala
 85 90

<210> 12
 <211> 327
 <212> DNA
 <213> M Tuberculosis

<220>
 <221> CDS
 <222> (1)...(327)

<400> 12
 gtg ctt ttg cct ctt ggt ccg cct ttg ccg ccc gac gcg gtg gtg gcg 48
 Val Leu Leu Pro Leu Gly Pro Pro Leu Pro Pro Asp Ala Val Val Ala
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1	5	10	15	
aaa cgg gct gag tgc gga atg ctc ggc ggg ttg tgc gtt ccg ctc agc				96
Lys Arg Ala Val Ser Gly Met Leu Gly Gly Leu Ser Val Pro Leu Ser	20	25	30	
tgg gga gtg gct gtg cca ccc gat gat tat gac cac tgg gcg cct gcg				144
Trp Gly Val Ala Val Pro Pro Asp Asp Tyr Asp His Trp Ala Pro Ala	35	40	45	
ccg gag gac ggc gcc gat gtc gat gtc cag gcg gcc gaa ggg gcg gac				192
Pro Glu Asp Gly Ala Asp Val Val Asp Val Gln Ala Ala Glu Gly Ala Asp	50	55	60	
gca gag gcc gcg gcc atg gac gag tgg gat gag tgg cag gcg tgg aac				240
Ala Glu Ala Ala Ala Met Asp Glu Trp Asp Glu Trp Gln Ala Trp Asn	65	70	75	80
gag tgg gtg gcg gag aac gct gaa ccc cgc ttt gag gtg cca cgg agt				288
Glu Trp Val Ala Glu Asn Ala Glu Pro Arg Phe Glu Val Pro Arg Ser	85	90	95	
agc agc agc gtg att ccg cat tct ccg gcg gcc ggc tag				327
Ser Ser Ser Val Ile Pro His Ser Pro Ala Ala Gly *	100	105		

<210> 13

<211> 108

<212> PRT

<213> M Tuberculosis

<400> 13

Met Leu Leu Pro Leu Gly Pro Pro Leu Pro Pro Asp Ala Val Val Ala				
Lys Arg Ala Glu Ser Gly Met Leu Gly Gly Leu Ser Val Pro Leu Ser	1	5	10	15
Trp Gly Val Ala Val Pro Pro Asp Asp Tyr Asp His Trp Ala Pro Ala	20	25	30	
Pro Glu Asp Gly Ala Asp Val Asp Val Gln Ala Ala Glu Gly Ala Asp	35	40	45	
Ala Glu Ala Ala Ala Met Asp Glu Trp Asp Glu Trp Gln Ala Trp Asn	50	55	60	80
Glu Trp Val Ala Glu Asn Ala Glu Pro Arg Phe Glu Val Pro Arg Ser	65	70	75	95
Ser Ser Ser Val Ile Pro His Ser Pro Ala Ala Gly	85	90		
	100	105		

<210> 14

<211> 324

<212> DNA

<213> M Tuberculosis

<220>

<221> CDS

<222> (1)...(324)

<400> 14

tgg acc cac aag cgc act aaa cgc cag cca gcc atc gcc gca ggg ctc				48
Leu Thr His Lys Arg Thr Lys Arg Gln Pro Ala Ile Ala Ala Gly Leu	1	5	10	15
aac gcc ccg cgt cgg aat cgc gtt ggg cgg caa cat ggt tgg ccg gcc				96

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Asn	Ala	Pro	Arg	Asn	Arg	Val	Gly	Arg	Gln	His	Gly	Trp	Pro	Ala		
		20					25					30				
gac	gtt	ccg	tcc	gcc	gag	cag	cgc	gcc	caa	cgg	cag	cgc	gac	ctc	144	
Asp	Val	Pro	Ser	Ala	Glu	Gln	Arg	Ala	Gln	Arg	Gln	Arg	Asp	Leu		
		35				40				45						
gag	gct	atc	cgc	cga	gcg	tac	gcc	gag	atg	gtg	gcg	aca	tca	gaa	192	
Glu	Ala	Ile	Arg	Arg	Ala	Tyr	Ala	Glu	Met	Val	Ala	Thr	Ser	His	Glu	
	50					55					60					
atc	gac	gac	gac	aca	gcc	gaa	ctg	gcg	ctg	ttg	tcg	atg	cat	ctc	gac	240
Ile	Asp	Asp	Asp	Thr	Ala	Glu	Leu	Ala	Leu	Leu	Ser	Met	His	Leu	Asp	
	65				70					75					80	
gat	gag	cag	cgc	cgg	ctt	gag	gcg	ggg	atg	aag	ctc	ggc	tggt	cat	ccg	288
Asp	Glu	Gln	Arg	Arg	Leu	Glu	Ala	Gly	Met	Lys	Leu	Gly	Trp	His	Pro	
				85					90					95		
tat	cac	ttc	ccc	gac	gaa	ccc	gac	agc	aaa	cag	tga					324
Tyr	His	Phe	Pro	Asp	Glu	Pro	Asp	Ser	Lys	Gln	*					
			100					105								

<210> 15
 <211> 107
 <212> PRT
 <213> M Tuberculosis

<400> 15																
Met	Thr	His	Lys	Arg	Thr	Lys	Arg	Gln	Pro	Ala	Ile	Ala	Ala	Gly	Leu	
1			5						10					15		
Asn	Ala	Pro	Arg	Asn	Arg	Val	Gly	Arg	Gln	His	Gly	Trp	Pro	Ala		
		20					25					30				
Asp	Val	Pro	Ser	Ala	Glu	Gln	Arg	Ala	Gln	Arg	Gln	Arg	Asp	Leu		
		35				40				45						
Glu	Ala	Ile	Arg	Arg	Ala	Tyr	Ala	Glu	Met	Val	Ala	Thr	Ser	His	Glu	
	50					55				60						
Ile	Asp	Asp	Asp	Thr	Ala	Glu	Leu	Ala	Leu	Leu	Ser	Met	His	Leu	Asp	
	65				70				75						80	
Asp	Glu	Gln	Arg	Arg	Leu	Glu	Ala	Gly	Met	Lys	Leu	Gly	Trp	His	Pro	
				85					90					95		
Tyr	His	Phe	Pro	Asp	Glu	Pro	Asp	Ser	Lys	Gln						
			100					105								

<210> 16
 <211> 246
 <212> DNA
 <213> M Tuberculosis

<220>
 <221> CDS
 <222> (1)...(246)

<400> 16																
atg	agc	ggc	cac	gcg	ttg	gct	gct	cgg	acg	ttg	ctg	gcc	gcc	gcg	gac	48
Met	Ser	Gly	His	Ala	Leu	Ala	Ala	Arg	Thr	Leu	Leu	Ala	Ala	Ala	Asp	
1				5					10					15		
gag	ctt	gtc	ggc	ggc	ccg	cca	gtc	gag	gct	tcg	gcc	gcc	gcg	ctg	gcc	96
Glu	Leu	Val	Gly	Gly	Pro	Pro	Val	Glu	Ala	Ser	Ala	Ala	Ala	Leu	Ala	
			20					25					30			

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ggc gac gcc gcg ggc gca tgg cgg acc gcg gcc gtc gag ctt gcg cga	144
Gly Asp Ala 35 Ala Gly Ala Trp Arg Thr Ala Ala Val Glu 45 Leu Ala Arg	
gcg ttg gtc cgc gct gtg gcg gag tgc cac ggc gtc gcg gcc gtt ttg	192
Ala Leu Val Arg Ala Val 55 Ala Glu Ser His Gly 60 Val Ala Ala Val Leu	
ttc gcc gcg acg gcc gcc gcg gcg gcg gcc gtc gac cgg ggt gat ccg	240
Phe 65 Ala Ala Thr Ala 70 Ala Ala Ala Ala Val 75 Asp Arg Gly Asp Pro 80	
ccg tga	246
Pro *	

<210> 17
 <211> 81
 <212> PRT
 <213> M Tuberculosis

<400> 17
 Met Ser Gly His Ala Leu Ala Ala Arg Thr Leu Leu Ala Ala Ala Asp
 1 5 10 15
 Glu Leu Val Gly Gly Pro Pro Val Glu Ala Ser Ala Ala Ala Leu Ala
 20 25 30
 Gly Asp Ala Ala Gly Ala Trp Arg Thr Ala Ala Val Glu Leu Ala Arg
 35 40 45
 Ala Leu Val Arg Ala Val Ala Glu Ser His Gly Val Ala Ala Val Leu
 50 55 60
 Phe Ala Ala Thr Ala Ala Ala Ala Ala Val 75 Asp Arg Gly Asp Pro 80
 65
 Pro

<210> 18
 <211> 294
 <212> DNA
 <213> M Tuberculosis

<220>
 <221> CDS
 <222> (1)...(294)

atg agt ttg ttg gat gcc cat att ccg cag ttg atc gct tgc cat acg	48
Met Ser Leu Leu Asp 5 Ala His Ile Pro Gln 10 Leu Ile Ala Ser His 15 Thr	
gcg ttt gcc gct aag gcg ggg ttg atg cgg cat acg atc ggt cag gcc	96
Ala Phe Ala Ala Lys 20 Ala Gly Leu Met 25 Arg His Thr Ile Gly 30 Gln Ala	
gag cag cag gcg atg tgc gcg cag gcg ttt cat cag gga gag tcc gcg	144
Glu Gln 35 Ala Met Ser Ala Gln 40 Ala Phe His Gln Gly 45 Glu Ser Ala	
gcg gcg ttt cag ggt gcg cat gcc cgg ttt gtg gcc gcg gcc gcc aag	192
Ala Ala Phe Gln Gly Ala His 55 Ala Arg Phe Val Ala Ala Ala Ala Lys 60	
gtc aat acc ttg ctg gat atc gcg caa gcc aat ttg ggt gag gcc gcg	240

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Val	Asn	Thr	Leu	Leu	Asp	Ile	Ala	Gln	Ala	Asn	Leu	Gly	Glu	Ala	Ala		
65					70					75					80		
ggc	acg	tat	gtg	gcc	gcc	gat	gcc	gcc	gcc	gcg	tcc	agc	tac	acc	ggg		288
Gly	Thr	Tyr	Val	Ala	Ala	Asp	Ala	Ala	Ala	Ala	Ser	Ser	Tyr	Thr	Gly		
				85					90					95			
ttt	tta																294
Phe	Leu																

<210> 19
 <211> 97
 <212> PRT
 <213> M Tuberculosis

Met	Ser	Leu	Leu	Asp	Ala	His	Ile	Pro	Gln	Leu	Ile	Ala	Ser	His	Thr		
1				5					10					15			
Ala	Phe	Ala	Ala	Lys	Ala	Gly	Leu	Met	Arg	His	Thr	Ile	Gly	Gln	Ala		
			20					25					30				
Glu	Gln	Gln	Ala	Met	Ser	Ala	Gln	Ala	Phe	His	Gln	Gly	Glu	Ser	Ala		
		35					40					45					
Ala	Ala	Phe	Gln	Gly	Ala	His	Ala	Arg	Phe	Val	Ala	Ala	Ala	Ala	Lys		
	50					55					60						
Val	Asn	Thr	Leu	Leu	Asp	Ile	Ala	Gln	Ala	Asn	Leu	Gly	Glu	Ala	Ala		
65					70					75				80			
Gly	Thr	Tyr	Val	Ala	Ala	Asp	Ala	Ala	Ala	Ala	Ser	Ser	Tyr	Thr	Gly		
				85					90					95			
Phe																	

<210> 20
 <211> 303
 <212> DNA
 <213> M Tuberculosis

<220>
 <221> CDS
 <222> (1)...(303)

atg	aac	gca	gac	ccc	gtg	ttg	tcg	tac	aac	ttt	gac	gcc	atc	gaa	tac		48
Met	Asn	Ala	Asp	Pro	Val	Leu	Ser	Tyr	Asn	Phe	Asp	Ala	Ile	Glu	Tyr		
1				5					10					15			
tcc	gtt	cgt	cag	gag	atc	cac	acc	acc	gcg	gcc	cgt	ttc	aac	gct	gcg		96
Ser	Val	Arg	Gln	Glu	Ile	His	Thr	Thr	Ala	Ala	Arg	Phe	Asn	Ala	Ala		
			20					25					30				
ctg	caa	gag	ctg	agg	tcg	cag	atc	gcg	ccg	ttg	cag	cag	ctc	tggt	aca		144
Leu	Gln	Glu	Leu	Arg	Ser	Gln	Ile	Ala	Pro	Leu	Gln	Leu	Leu	Trp	Thr		
		35					40					45					
cgg	gaa	gcg	gcc	gcc	gcc	tac	cac	gcg	gag	caa	ctc	aag	ttg	cac	cag		192
Arg	Glu	Ala	Ala	Ala	Ala	Tyr	His	Ala	Glu	Gln	Leu	Lys	Trp	His	Gln		
	50					55					60						
gcg	gcc	agc	gcg	ctc	aac	gag	atc	ctg	atc	gac	ttg	gga	aac	gcg	gtt		240
Ala	Ala	Ser	Ala	Leu	Asn	Glu	Ile	Leu	Ile	Asp	Leu	Gly	Asn	Ala	Val		
65					70					75				80			

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cgc cac ggt gcc gac gac gtg gcg cat gcc gac cgg cgg gcg gct gga 288
 Arg His Gly Ala Asp 85 Asp Val Ala His Ala Asp Arg Arg Ala Ala Gly 95

gct tgg gca cgc tag 303
 Ala Trp Ala Arg 100

<210> 21
 <211> 100
 <212> PRT
 <213> M Tuberculosis

<400> 21
 Met Asn Ala Asp Pro Val Leu Ser Tyr Asn Phe Asp Ala Ile Glu Tyr
 1 5 10 15
 Ser Val Arg Gln Glu Ile His Thr Thr Ala Ala Arg Phe Asn Ala Ala
 20 25 30
 Leu Gln Glu Leu Arg Ser Gln Ile Ala Pro Leu Gln Gln Leu Trp Thr
 35 40 45
 Arg Glu Ala Ala Ala Tyr His Ala Glu Gln Lys Trp His Gln
 50 55 60
 Ala Ala Ser Ala Leu Asn Glu Ile Leu Ile Asp Leu Gly Asn Ala Val
 65 70 75 80
 Arg His Gly Ala Asp 85 Asp Val Ala His Ala Asp Arg Arg Ala Ala Gly 95
 Ala Trp Ala Arg 100

<210> 22
 <211> 378
 <212> DNA
 <213> M Tuberculosis

<220>
 <221> CDS
 <222> (1)...(378)

<400> 22 48
 ttg gtt gaa ccg gga agg atc gga ggg aac cag acg agg ttg gcg gcg
 1 Val Glu Pro Gly 5 Arg Ile Gly Gly Asn Gln Thr Ala Ala 15

gtc cta ctt gat gtg agc aca ccg aac acg ctg aac gcc gac ttt gac 96
 Val Leu Leu Asp 20 Val Ser Thr Pro Asn 25 Thr Leu Asn Ala Asp 30 Phe Asp

ctg atg cgt tcg gtt gcg ggt atc acg gac gcc cgc aat gag gaa atc 144
 Leu Met Arg 35 Ser Val Ala Gly 40 Thr Asp Ala Arg Asp 45 Glu Glu Ile

cgt gcg atg ctg cag gca ttc atc ggc cgc atg agc ggt gtg ccg ccg 192
 Arg Ala Met Leu Gln Ala Phe 55 Ile Gly Arg Met Ser 60 Gly Val Pro Pro

tcg gtg tgg ggt ggg ctc gcg gcc gct cgg ttc cag gat gtg gtg gat 240
 Ser Val Trp Gly Gly Leu 70 Ala Ala Ala Arg Phe 75 Gln Asp Val Val Asp 80

cgc tgg aac gcc gag tcg acg cgg ctc tac cac gtc ctg cac gcg atc 288
 Arg Trp Asn Ala Glu 85 Ser Thr Arg Leu Tyr 90 His Val Leu His Ala Ile 95

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gcc gac acc atc cgc cac aac gag gcc gcg ctg cgg gaa gcc ggc caa 336
 Ala Asp Thr Ile Arg His Asn Glu Ala Ala Leu Arg Glu Ala Gly Gln
 100 105 110

atc cat gcc cgc cac atc gcc gcc gcc ggc gac cta tag 378
 Ile His Ala Arg His Ile Ala Ala Gly Gly Asp Leu *
 115 120 125

<210> 23
 <211> 125
 <212> PRT
 <213> M Tuberculosis

<400> 23
 Met Val Glu Pro Gly Arg Ile Gly Gly Asn Gln Thr Arg Leu Ala Ala
 1 5 10 15
 Val Leu Leu Asp Val Ser Thr Pro Asn Thr Leu Asn Ala Asp Phe Asp
 20 25 30
 Leu Met Arg Ser Val Ala Gly Ile Thr Asp Ala Arg Asn Glu Glu Ile
 35 40 45
 Arg Ala Met Leu Gln Ala Phe Ile Gly Arg Met Ser Gly Val Pro Pro
 50 55 60
 Ser Val Trp Gly Gly Leu Ala Ala Arg Phe Gln Asp Val Val Asp
 65 70 75 80
 Arg Trp Asn Ala Glu Ser Thr Arg Leu Tyr His Val Leu His Ala Ile
 85 90 95
 Ala Asp Thr Ile Arg His Asn Glu Ala Ala Leu Arg Glu Ala Gly Gln
 100 105 110
 Ile His Ala Arg His Ile Ala Ala Gly Gly Asp Leu
 115 120 125

<210> 24
 <211> 288
 <212> DNA
 <213> M Tuberculosis

<220>
 <221> CDS
 <222> (1)...(288)

<400> 24
 atg tca gat caa atc acg tat aac ccg gga gcc gta tcc gac ttc gct 48
 Met Ser Asp Gln Ile Thr Tyr Asn Pro Gly Ala Val Ser Asp Phe Ala
 1 5 10 15

tcc gac gtg ggc tcg cgc gcc ggc cag ctc cac atg att tac gaa gac 96
 Ser Asp Val Gly Ser Arg Ala Gly Gln Leu His Met Ile Tyr Glu Asp
 20 25 30

acc gcc agc aaa aca aat gcg ctg caa gag ttt ttc gcg ggc cac ggc 144
 Thr Ala Ser Lys Thr Asn Ala Leu Gln Glu Phe Phe Ala Gly His Gly
 35 40 45

gcg caa ggg ttt ttc gac gcc cag gcg cag atg ctg tcg ggg ctg cag 192
 Ala Gln Gly Phe Phe Asp Ala Gln Ala Gln Met Leu Ser Gly Leu Gln
 50 55 60

ggg ctc att gag acg gtg ggt cag cat ggg act acc acc ggc cac gtg 240
 Gly Leu Ile Glu Thr Val Gly Gln His Gly Thr Thr Thr Gly His Val
 65 70 75 80

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```

ctg gac aac gcg atc gga acc gac cag gcc atc gcg ggc ttg ttc taa *      288
Leu Asp Asn Ala Ile 85 Gly Thr Asp Gln Ala Ile Ala Gly Leu Phe 95

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<210> 25
<211> 95
<212> PRT
<213> M Tuberculosis

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<400> 25
Met Ser Asp Gln Ile Thr Tyr Asn Pro Gly Ala Val Ser Asp Phe Ala
1      5      10      15
Ser Asp Val Gly Ser Arg Ala Gly Gln Leu His Met Ile Tyr Glu Asp
20      25      30
Thr Ala Ser Lys Thr Asn Ala Leu Gln Glu Phe Phe Ala Gly His Gly
35      40      45
Ala Gln Gly Phe Phe Asp Ala Gln Ala Gln Met Leu Ser Gly Leu Gln
50      55      60
Gly Leu Ile Glu Thr Val Gly Gln His Gly Thr Thr Thr Gly His Val
65      70      75      80
Leu Asp Asn Ala Ile 85 Gly Thr Asp Gln Ala Ile Ala Gly Leu Phe 95

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<210> 26
<211> 324
<212> DNA
<213> M Tuberculosis

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<220>
<221> CDS
<222> (1)...(324)

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<400> 26
gtg gca gac aca att cag gta aca ccg cag atg ctg cgc agc acc gcc      48
Val Ala Asp Thr Ile 5 Gln Val Thr Pro Gln Met Leu Arg Ser Thr Ala 15
1
aac gat atc cag gcg aat atg gag caa gcc atg gga atc gcc aag ggc      96
Asn Asp Ile Gln Ala Asn Met Glu Gln 25 Ala Met Gly Ile Ala Lys Gly 30
20
tac cta gcc aac cag gaa aac gtc atg aac ccc gcc acc tgg tct ggt      144
Tyr Leu Ala 35 Asn Gln Glu Asn Val 40 Met Asn Pro Ala Thr 45 Trp Ser Gly
40
acc ggc gtc gtt gct tcg cat atg aca gcc acc gag atc acc aat gaa      192
Thr Gly Val Val Ala Ser His 55 Met Thr Ala Thr 60 Ile Thr Asn Glu 65
50
ttg aac aag gtc ctt acc ggg ggc acg cgc ctg gcc gag ggc ctc gtg      240
Leu Asn Lys Val Leu Thr 70 Gly Gly Thr Arg Leu 75 Ala Glu Gly Leu Val 80
65
cag gcc gca gcc ctg atg gag gga cac gag gcg gac tcg cag aca gcg      288
Gln Ala Ala Ala 85 Met Glu Gly His 90 Gln Ala Asp Ser Gln Thr 95 Thr
90
ttt cag gcg ctg ttc ggc gct agc cac gga tcc tga *      324
Phe Gln Ala 100 Phe Gly Ala Ser His 105 Gly Ser
100

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<210> 27

<211> 107

<212> PRT

<213> M Tuberculosis

<400> 27

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Met Ala Asp Thr Ile Gln Val Thr Pro Gln Met Leu Arg Ser Thr Ala
1      5      10      15
Asn Asp Ile Gln Ala Asn Met Glu Gln Ala Met Gly Ile Ala Lys Gly
20      25      30
Tyr Leu Ala Asn Gln Glu Asn Val Met Asn Pro Ala Thr Trp Ser Gly
35      40      45
Thr Gly Val Val Ala Ser His Met Thr Ala Thr Glu Ile Thr Asn Glu
50      55      60
Leu Asn Lys Val Leu Thr Gly Gly Thr Arg Leu Ala Glu Gly Leu Val
65      70      75      80
Gln Ala Ala Ala Leu Met Glu Gly His Glu Ala Asp Ser Gln Thr Ala
85      90      95
Phe Gln Ala Leu Phe Gly Ala Ser His Gly Ser
100      105

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<210> 28

<211> 273

<212> DNA

<213> M Tuberculosis

<220>

<221> CDS

<222> (1)...(273)

<400> 28

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gtg gat ccg acc gtg ttg gct gat gcg gtg gcg cgg atg gcc gaa ttc      48
Val Asp Pro Thr Val Leu Ala Asp Ala Val Ala Arg Met Ala Glu Phe
1      5      10
ggt cgc cac gtc gag gag ctg gtc gcc gag att gag tcc ttg gtt acc      96
Gly Arg His Val Glu Glu Leu Val Glu Ile Glu Ser Leu Val Thr
20      25      30
cgg ctg cat gtg acg tgg acg ggg gag ggc gcg cgg gct cat gct gag      144
Arg Leu His Val Thr Trp Thr Gly Glu Gly Ala Ala Ala His Ala Glu
35      40      45
gcg caa cga cat tgg gct gcc ggt gag gcg atg atg cgc cag gcg ttg      192
Ala Gln Arg His Trp Ala Ala Gly Glu Ala Met Met Arg Gln Ala Leu
50      55      60
gcc cag ctc acg gcc gcg ggg cag agc gcg cac gcc aac tac acc ggc      240
Ala Gln Leu Thr Ala Ala Gly Gln Ser Ala His Ala Asn Tyr Thr Gly
65      70      75      80
gcg atg gcc acg aat ttg ggt atg tgg tcg tga      273
Ala Met Ala Thr Asn Leu Gly Met Trp Ser
85      90

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<210> 29

<211> 90

<212> PRT

<213> M Tuberculosis

<400> 29

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Met Asp Pro Thr Val Leu Ala Asp Ala Val Ala Arg Met Ala Glu Phe

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1 5 10 15
Gly Arg His Val Glu Glu Leu Val Ala Glu Ile Glu Ser Leu Val Thr
20 25 30
Arg Leu His Val Thr Trp Thr Gly Glu Gly Ala Ala Ala His Ala Glu
35 40 45
Ala Gln Arg His Trp Ala Ala Gly Glu Ala Met Met Arg Gln Ala Leu
50 55 60
Ala Gln Leu Thr Ala Ala Gly Gln Ser Ala His Ala Asn Tyr Thr Gly
65 70 75 80
Ala Met Ala Thr Asn Leu Gly Met Trp Ser
85 90

<210> 30
<211> 312
<212> DNA
<213> M Tuberculosis

<220>
<221> CDS
<222> (1)...(312)

<400> 30
atg ggt gcc gac gac acg ctg cgc gta gag cct gcg gtg atg cag ggt 48
Met Gly Ala Asp Asp Thr Leu Arg Val Glu Pro Ala Val Met Gln Gly
1 5 10 15
ttc gcc gcg tcg ttg gat gga gcg gcc cat ctc gcg gtt caa ctg 96
Phe Ala Ala Ser Leu Asp Gly Ala Ala Glu His Leu Ala Val Gln Leu
20 25 30
gcc gag ctg gac gct cag gtc ggg cag atg ttg gcc ggg gcg ggg 144
Ala Glu Leu Asp Ala Gln Val Gly Gln Met Leu Gly Gly Trp Arg Gly
35 40 45
gcg tcg gcc agt gcg tat gcc tcg gcg tgg gag cta tgg cat cgc ggg 192
Ala Ser Gly Ser Ala Tyr Gly Ser Ala Trp Glu Leu Trp His Arg Gly
50 55 60
gcc ggt gag gtg cag ctg gga ttg tcg atg ctg gcg gcg gcg ata gct 240
Ala Gly Glu Val Gln Leu Gly Leu Ser Met Leu Ala Ala Ala Ile Ala
65 70 75 80
cac gcc ggt gcg ggt tat caa cac aac gag acc gcg tcg gcg cag gtg 288
His Ala Gly Ala Gln Tyr Gln His Asn Glu Thr Ala Ser Ala Gln Val
85 90 95
ctt cgt gag gtg gcc ggt gcc tga 312
Leu Arg Glu Val Gly Gly Gly *
100

<210> 31
<211> 103
<212> PRT
<213> M Tuberculosis

<400> 31
Met Gly Ala Asp Asp Thr Leu Arg Val Glu Pro Ala Val Met Gln Gly
1 5 10 15
Phe Ala Ala Ser Leu Asp Gly Ala Ala Glu His Leu Ala Val Gln Leu
20 25 30
Ala Glu Leu Asp Ala Gln Val Gly Gln Met Leu Gly Gly Trp Arg Gly
35 40 45

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Ala Ser Gly Ser Ala Tyr Gly Ser Ala Trp Glu Leu Trp His Arg Gly
 50 55 60
 Ala Gly Glu Val Gln Leu Gly Leu Ser Met Leu Ala Ala Ala Ile Ala
 65 70 75 80
 His Ala Gly Ala Gly Tyr Gln His Asn Glu Thr Ala Ser Ala Gln Val
 85 90 95
 Leu Arg Glu Val Gly Gly Gly
 100

<210> 32

<211> 26

<212> DNA

<213> Artificial Sequence

<220>

<223> cloning primer

<400> 32

ctgagatcta tgagcctttt ggatgc

26

<210> 33

<211> 31

<212> DNA

<213> Artificial Sequence

<220>

<223> cloning primer

<400> 33

ctaagcttgg atcctcagaa cccggtatag g

31

<210> 34

<211> 30

<212> DNA

<213> Artificial Sequence

<220>

<223> cloning primer

<400> 34

ctgagatctt tgatccccgg tcggatgggtg

30

<210> 35

<211> 30

<212> DNA

<213> Artificial Sequence

<220>

<223> cloning primer

<400> 35

ctcccatggg tcaggtgatc gaatcagcca

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<210> 36

<211> 25

<212> DNA

<213> Artificial Sequence

<220>

<223> cloning primer

<400> 36

ctgagatcta tgaccatcaa ctatc

25

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<210> 37
<211> 32
<212> DNA
<213> Artificial Sequence

<220>
<223> cloning primer

<400> 37
ctaagcttgg atccttaggc ccagctggag cc          32

<210> 38
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> cloning primer

<400> 38
ctgagatcta tgaccatcaa ctatc                    25

<210> 39
<211> 32
<212> DNA
<213> Artificial Sequence

<220>
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<400> 39
ctaagcttgg atcctcaggc ccagctggag cc          32

<210> 40
<211> 30
<212> DNA
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<220>
<223> cloning primer

<400> 40
ctgagatctg tgcttttgcc tcttggtccg            30

<210> 41
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> cloning primer

<400> 41
ccaagcttc tagccggccg ccggaga                27

<210> 42
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> cloning primer

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<400> 42	
ctgagatctt tgaccacaaa gcgcactaaa	30
<210> 43	
<211> 31	
<212> DNA	
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<400> 43	
ctcccatggt cactgtttcg ctgtcgggtt c	31
<210> 44	
<211> 30	
<212> DNA	
<213> Artificial Sequence	
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<223> cloning primer	
<400> 44	
ctgagatcta tgagcgcca cggttggt	30
<210> 45	
<211> 30	
<212> DNA	
<213> Artificial Sequence	
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<223> cloning primer	
<400> 45	
ctcccatggt cagggcggt caccgggtc	30
<210> 46	
<211> 30	
<212> DNA	
<213> Artificial Sequence	
<220>	
<223> cloning primer	
<400> 46	
ctgagatcta tgagttgtt ggatgccat	30
<210> 47	
<211> 30	
<212> DNA	
<213> Artificial sequence	
<400> 47	
ctcccatggt taaaaccgg ttagctgga	30
<210> 48	
<211> 27	
<212> DNA	
<213> Artificial Sequence	
<220>	
<223> cloning primer	

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<400> 48 ctgagatcta tgaacgcaga ccccgctg	27
<210> 49 <211> 32 <212> DNA <213> Artificial Sequence	
<220> <223> cloning primer	
<400> 49 ctaagcttgg atccctagcg tgccaagct cc	32
<210> 50 <211> 27 <212> DNA <213> Artificial Sequence	
<220> <223> cloning primer	
<400> 50 ctgagatcta tggttgaacc ggggaagg	27
<210> 51 <211> 32 <212> DNA <213> Artificial Sequence	
<220> <223> cloning primer	
<400> 51 ctaagcttgg atccctatag gtcgccgccg gc	32
<210> 52 <211> 27 <212> DNA <213> Artificial Sequence	
<220> <223> cloning primer	
<400> 52 ctgagatcta tgtcagatca aatcacg	27
<210> 53 <211> 30 <212> DNA <213> Artificial Sequence	
<220> <223> cloning primer	
<400> 53 ctaagcttgg atccttagaa caagcccgcg	30
<210> 54 <211> 28 <212> DNA <213> Artificial Sequence	

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<220>
<223> cloning primer

<400> 54
ctgagatcta tggcagacac aattcagg                28

<210> 55
<211> 32
<212> DNA
<213> Artificial Sequence

<220>
<223> cloning primer

<400> 55
ctaagcttcc cgggtcagga tccgtggcta gc          32

<210> 56
<211> 28
<212> DNA
<213> Artificial Sequence

<220>
<223> cloning primer

<400> 56
ctgagatcta tggatccgac cgtgttgg                28

<210> 57
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> cloning primer

<400> 57
ctgccatggt cagcaccaca tacc                    25

<210> 58
<211> 26
<212> DNA
<213> Artificial Sequence

<220>
<223> cloning primer

<400> 58
ctgagatcta tgggtgccga cgacac                  26

<210> 59
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> cloning primer

<400> 59
ctaagcttgg atcctcagcc accgcccacc              30

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